

1

2,923,628

## SYNTHETIC MILK

Harold L. Otto, New York, N.Y.

No Drawing. Application November 4, 1957  
Serial No. 694,132

3 Claims. (Cl. 99—63)

The present invention relates to synthetic milk and more particularly to a synthetic milk which simulates bovine or cow's milk to a degree to which the average person cannot distinguish my synthetic milk from bovine milk. (The term "milk" will hereinafter be used to refer to bovine or cow's milk, and the term "unsaturated fatty acid milk" to the beverage of the present invention.

It is well known that the minimum and maximum values for the constituents of milk are as shown in Table I.

TABLE I

Constituent	Minimum	Maximum
Fat	2.60	8.37
Protein	2.44	6.48
Lactose	2.41	6.11
Ash	0.560	0.936
Total solids	10.56	17.90
Solids-not-fat	7.20	11.90
Specific gravity	1.0231	1.0398

Furthermore, an average sample of milk contains the fatty acids shown in Table II. (This table has been selected because it lists all the fatty acids having an even number of carbon atoms from 4 to 20, and it is quite possible that samples of some milks might not contain one or more of the listed fatty acids. The range of stearic acid is known to be between 7.80% to 20.37%, of palmitic acid, between 5.78% to 22.86%, and between 25.27% to 40.31% of oleic acid.)

TABLE II

Fatty Acid	Number of Carbon Atoms	Acid, Percent	Soluble in Water	Volatile in Steam	Satur. or Unsat.	M.P., ° C.
Butyric	4	3.7	Yes	Yes	Satur	-7.0
Caproic	6	2.0	Yes	Yes	Satur	-8.0
Caprylic	8	1.3	Yes	Yes	Satur	16.5
Capric	10	2.7	Yes	Yes	Satur	31.3
Lauric	12	4.0	No	Yes	Satur	43.6
Myristic	14	7.9	No	No	Satur	54.0
Palmitic	16	23.8	No	No	Satur	63.0
Stearic	18	10.7	No	No	Satur	69.3
Arachidic	20	0.5	No	No	Satur	77.0
Oleic	18	38.3	No	No	Unsat	13.0
Linoleic	18	4.7	No	No	Unsat	-18.0

As can readily be seen from the above table, linoleic acid, which is highly desirable because it is essential metabolite comprises only a tiny fraction of the total fatty acid. Attempts have been made to increase the linoleic acid content of milk with little success as variations in cow's feed result in changes principally from the butyric to the oleic acids. It has likewise been proposed to make a synthetic milk, but the difficulties presented are not only chemical, but also medical and psychological. Present synthetic milks are used mostly as infant feed and have a disagreeable or unsatisfactory taste, nor do they act or feel like milk.

2

Although many attempts were made to overcome the foregoing difficulties and other difficulties, none, as far as I am aware, was entirely successful when carried into practice commercially on an industrial scale.

It has now been discovered that a milk can be synthesized, and at the same time, increase substantially the proportion of unsaturated fatty acid, particularly linoleic acid, without the average person being aware of the difference upon drinking this synthetic unsaturated fatty acid milk.

It is an object of the present invention to provide an unsaturated fatty acid milk which looks, feels, smells, pours and tastes exactly like milk.

Another object of the invention is to provide an unsaturated fatty acid milk having a high percentage of linoleic acid.

The invention also contemplates providing a process for making such a nutritious, desirable, unsaturated fatty acid milk when and where fresh milk is unavailable or uneconomical to produce.

The invention also contemplates providing an unsaturated fatty acid milk which is easy to store, package and transport.

Broadly speaking, the present invention contemplates making a synthetic milk by adding to certain dairy by-products, natural food substances which could not have been produced by the cow under any circumstances. The principal objection to the soya bean milks now produced has been the lack of dairy taste. I have eliminated the soya bean or other unfamiliar tastes by using sweet dairy whey, lactic acid, carotene, diacetyl and acetylmethylcarbinol, and have produced an unsaturated fatty acid milk having the following characteristics:

TABLE III

Constituents of my unsaturated fatty acid milk:	
Water	About 80% to about 60%
Protein	About 5% to about 10%.
Fat	About 5% to about 10%.
Lactose	About 5% to about 10%.
Salts	About 5% to about 10%.

The distribution of the fatty acids in my unsaturated fatty acid milk is as follows:

About 2% of the saturated fatty acids of the general formula  $C_nH_{2n+1}COOH$ , where  $n$  is an odd number from 3 to 19, from about 3.3% to about 5% phospholipides, and from about 4% to about 6% linoleic acid. The mineral content is that of milk, the percentage distribution of the mineral content being precisely that of milk.

In carrying the invention into practice, it is preferred to assemble the ingredients as follows:

To about 100 parts of water, from 10 to 12 parts of dried sweet dairy whey are added and mixed. After this material is in solution, 7 to 10 parts of a mixture of equal weight of lecithin and safflower seed oil are added and churned. When both have entered into an emulsion, lactic acid is added to bring the pH to between 6 and 6.5. Traces of carotene, diacetyl and acetylmethylcarbinol are added to the churning mixture. The synthetic milk so obtained can be used just like ordinary milk. Cream may be separated particularly when higher percentages of safflower seed oil are added to the basic product and butter may be made from the above described synthetic milk in the same way as real milk.

For the purpose of giving those skilled in the art a better understanding of the invention and a better appreciation of the advantages of the invention, the following illustrative examples are given:

## Example I

To 1000 grams of water, were added 120 grams of